

1. (Currently Amended) A method for decoding a packet transmitted over a channel, the packet including a plurality of samples, said method comprising:  
in a first iteration, generating a first set of soft estimates of bits based upon a computation of a first feed-forward filter and a first feedback filter as a function of an estimate of the channel; and  
in a second iteration, generating a second set of soft estimates of bits based upon a computation of a second feed-forward filter and a second feedback filter as a function of a first set of soft symbol estimates obtained during the first iteration.

2. (Original) The method of claim 1, further comprising:  
generating a set of hard estimates of bits based upon a computation of a third feed-forward filter and a third feedback filter as a function of a second set of soft symbol estimates.

3. (Currently Amended) A device for decoding a packet transmitted over a channel, the packet including a plurality of samples, said device comprising:  
means for generating in a first iteration, a first set of soft estimates of bits based upon a computation of a first feed-forward filter and a first feedback filter as a function of an estimate of the channel; and  
means for generating in a second iteration, a second set of soft estimates of bits based upon a computation of a second feed-forward filter and a second feedback filter as a function of a first set of soft symbol estimates obtained during the first iteration.

4. (Original) The device of claim 3, further comprising:

means for generating a set of hard estimates of bits based upon a computation of a third feed-forward filter and a third feedback filter as a function of a second set of soft symbol estimates.

5. (Original) A method for decoding a packet transmitted over a channel, the packet including a plurality of samples, said method comprising:

providing a first set of soft symbol estimates; and

computing a first feed-forward filter and a first feedback filter as a function of the first set of soft symbol estimates;

wherein the first feed-forward filter and the first feedback filter are computed according to:

$$\mathbf{x} = \begin{bmatrix} \mathbf{y}(i) \\ \hat{\mathbf{s}}^{(n)}(i) \end{bmatrix}$$

$$\begin{bmatrix} \mathbf{f}^{(n)} \\ \mathbf{b}^{(n)} \end{bmatrix} = \mathbf{R}_{\mathbf{xx}}^{-1} \mathbf{R}_{\mathbf{xs}^{(n)}}, \quad \text{where}$$

$$\mathbf{R}_{\mathbf{xx}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \mathbf{x}^H(i)$$

$$\mathbf{R}_{\mathbf{xs}^{(n)}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \left( \hat{\mathbf{s}}^{(n)}(i) \right)^*$$

6. (Cancelled)

7. (Original) The method of claim 5, further comprising:

filtering the plurality of samples through the first feed-forward filter; and

filtering the first set of soft symbol estimates through the first feedback filter.

8. (Original) The method of claim 7, further comprising:

providing a first set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the first feed-forward filter and a filtering of the first set of soft symbol estimates through the first feedback filter.

9. (Original) The method of claim 8, wherein the a first set of decision feedback equalization outputs are computed according to:

$$z^{(n)}(i) = \left( \mathbf{f}^{(n)} \right)^H y(i) + \left( \mathbf{b}^{(n)} \right)^H \hat{\mathbf{s}}^{(n)}(i)$$

10. (Original) The method of claim 8, further comprising:  
providing a second set of soft symbol estimates; and  
computing a second feed-forward filter and a second feedback filter as a function of the second set of soft symbol estimates.

11. (Original) The method of claim 10, further comprising:  
filtering the plurality of samples through the second feed-forward filter; and  
filtering the second set of soft symbol estimates through the second feedback filter.

12. (Original) The method of claim 11, further comprising:  
providing a second set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the second feed-forward filter and a filtering of the second set of soft symbol estimates through the second feedback filter.

13. (Currently Amended) A device for decoding a packet transmitted over a channel, the packet including a plurality of samples, said device comprising:

a soft symbol estimator providing a first set of soft symbol estimates in response to a reception of the packet by said device;

a first feed-forward filter computed as a function of the first set of soft symbol estimates; and

a first feedback filter computed as a function of the first set of soft symbol estimates;

wherein said first feed-forward filter and said first feedback filter are computed according to:

$$\mathbf{x} = \begin{bmatrix} y(i) \\ \hat{\mathbf{s}}^{(n)}(i) \end{bmatrix}$$

$$\begin{bmatrix} \mathbf{f}^{(n)} \\ \mathbf{b}^{(n)} \end{bmatrix} = \mathbf{R}_{\mathbf{xx}}^{-1} \mathbf{R}_{\mathbf{x}\hat{\mathbf{s}}^{(n)}}, \quad \text{where}$$

$$\mathbf{R}_{\mathbf{xx}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \mathbf{x}^H(i)$$

$$\mathbf{R}_{\mathbf{x}\hat{\mathbf{s}}^{(n)}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \left( \hat{\mathbf{s}}^{(n)}(i) \right)^*$$

14. (Cancelled).

15. (Currently Amended) The device of claim 13, wherein  
 said first feed-forward filter filters the plurality of samples upon a computation of said first feed-forward filter; and  
 said feedback filter filters the first set of soft symbol estimates upon a computation of said first feedback filter.

16. (Currently Amended) The device of claim 15, further comprising:  
 an adder providing a first set of decision feedback equalization outputs in response to a filtering of the plurality of samples through said first feed-forward filter and a filtering of the first set of soft symbol estimates through said first feedback filter.

17. (Original) The device of claim 16, wherein the a first set of decision feedback equalization outputs are computed in according to:

$$z^{(n)}(i) = \left( \mathbf{f}^{(n)} \right)^H \mathbf{y}(i) + \left( \mathbf{b}^{(n)} \right)^H \hat{\mathbf{s}}^{(n)}(i)$$

18. (Currently Amended) The device of claim 16, further comprising:  
 a second feed-forward filter computed as a function of a second set of soft symbol estimates; and  
 a second feedback filter computed as a function of the second set of soft symbol estimates,

wherein said soft symbol estimator provides the second set of soft symbol estimates in response to said adder providing said first ~~output signal set~~ of decision feedback equalization outputs.

19. (Original) The device of claim 18, wherein:  
 said second feed-forward filters the plurality of samples upon a computation of said second feed-forward filter; and  
 said second feedback filter filters the second set of soft symbol estimates upon a computation of said second feedback filter.

20. (Original) The device of claim 19, wherein  
 said adder further provides a second set of decision feedback equalization outputs in response to a filtering of the plurality of samples through said second feed-forward filter and a filtering of the second set of soft symbol estimates through said second feedback filter.

21. (Currently Amended) A computer readable medium storing a computer program comprising:

computer readable code for generating during a first iteration, a first set of soft estimates of a plurality of bits based upon a computation of a first feed-forward filter and a first feedback filter as a function of an estimate of a channel; and

computer readable code for generating during a second iteration, a second set of soft estimates of the plurality of bits based upon a computation of a second feed-forward filter and a second feedback filter as a function of a first set of soft symbol estimates obtained during the first iteration.

22. (Original) The computer readable medium of claim 21, further comprising:

computer readable code for generating a set of hard estimates of the plurality of bits based upon a computation of a third feed-forward filter and a third feedback filter as a function of a second set of soft symbol estimates.

23. (Original) A computer readable medium storing a computer program comprising:  
 computer readable code for providing a first set of soft symbol estimates;  
 and  
 computer readable code for computing a first feed-forward filter and a first feedback filter as a function of the first set of soft symbol estimates;  
wherein the first feed-forward filter and the first feedback filter are computed according to:

$$\mathbf{x} = \begin{bmatrix} y(i) \\ \hat{s}^{(n)}(i) \end{bmatrix}$$

$$\begin{bmatrix} \mathbf{f}^{(n)} \\ \mathbf{b}^{(n)} \end{bmatrix} = \mathbf{R}_{\mathbf{xx}}^{-1} \mathbf{R}_{\mathbf{x}\hat{\mathbf{s}}^{(n)}}, \quad \text{where}$$

$$\mathbf{R}_{\mathbf{xx}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \mathbf{x}^H(i)$$

$$\mathbf{R}_{\mathbf{x}\hat{\mathbf{s}}^{(n)}} = \sum_{i=0}^{M-1} \mathbf{x}(i) \left( \hat{s}^{(n)}(i) \right)^*$$

24. (Cancelled)

25. (Original) The computer readable medium of claim 24, further comprising:  
 computer readable code for filtering the plurality of samples through the first feed-forward filter; and  
 computer readable code for filtering the first set of soft symbol estimates through the first feedback filter.

26. (Original) The computer readable medium of claim 25, further comprising:  
 computer readable code for providing a first set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the first feed-forward filter and a filtering of the first set of soft symbol estimates through the first feedback filter.

27. (Original) The computer readable medium of claim 26, wherein the a first set of decision feedback equalization outputs are computed according to:

$$z^{(n)}(i) = \left( \mathbf{f}^{(n)} \right)^H \mathbf{y}(i) + \left( \mathbf{b}^{(n)} \right)^H \hat{\mathbf{s}}^{(n)}(i)$$

28. (Original) The computer readable medium of claim 26, further comprising:

computer readable code for providing a second set of soft symbol estimates; and

computer readable code for computing a second feed-forward filter and a second feedback filter as a function of the second set of soft symbol estimates.

29. (Original) The computer readable medium of claim 28, further comprising:

computer readable code for filtering the plurality of samples through the second feed-forward filter; and

computer readable code for filtering the second set of soft symbol estimates through the second feedback filter.

30. (Original) The computer readable medium of claim 29, further comprising:

computer readable code for providing a second set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the second feed-forward filter and a filtering of the second set of soft symbol estimates through the second feedback filter.